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Main catch, bycatch, discard catch of set lift net fisheries with Light Emitting Diode (LED) as light attractor in marine coastal waters of Pangkep, Makassar Strait, Indonesia

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Abstract. Application of light emitting diode (LED) is considered to energy saving and increased catches in lift net fisheries. Set lift net fisheries in marine coastal waters of Pangkep used compact fluorescent lamp (CFL) but this lamps consumed high energy and fuels. Application of light emitting diode (LED) is considered to energy saving and increased catches in lift net fisheries. The experimental fishing trial was conducted on 22 July-25 August 2020 in marine coastal waters of Pangkep, Makassar Strait, Indonesia. The study using 1 units of set lift net with LED as light attractor. The result of study show that The fishes catch consist of main catch 149.21 kg (67.73 %), by catch 37.28 kg (16.93 %), and discard catch 43.76 kg (19.86 %).

1. Introduction

Light fishing is one the most successful methods for capturing commercially important fish species [1]. Light fishing is the fishing operations technique that use of artificial light to attract, aggregate, and eventually capture fishes. Various fishing gears them using such as lift net, hooks, gill net, purse seine, beach seine, cast net, etc.

Lift Net is one of the fish catch method that use light as fish attractor device. Set Lift net is a traditional fishing gear constructed from bamboo in a square form. The bamboos are attached in the seabed and stand firmly above the water. Net is fitted in the middle of the building. The fishing operation use light as attractor to collect fishes. Fish schools tend to aggregate in fish attractor devices [2] and also swimming crab [3].

Set lift net fisheries in marine coastal waters of Pangkep used compact fluorescent lamp (CFL) but this lamps consumed high energy and fuels. Application of light emitting diode (LED) is considered to energy saving and increased catches in lift net fisheries.

Light-emitting diodes (LEDs) have applicated in fishery lighting to capture fishes due to their advantages including: longer lifetime, higher efficiency, and reduced environmental impact [4]. On the other hand, there is lack information about the main catch, by catch and discard catch of set lift net with LED lamp as light attractor. It is necessary to be done for evaluation and improvement LED lamp as light attractor.

The objective of present study was to investigate the main catch, by catch and discard catch of set lift net with LED lamp as light attractor in marine coastal waters of Pangkep. Makassar Strait, Indonesia.



2. Materials and Methods

The study was conducted from May to June 2020 in marine coastal waters of Pangkep regency, Makassar Strait Indonesia. The fishing base was Tekolabbua Village, Pangkep Regency South Sulawesi in position 04°79'07.71" - 4°79'14.35" S and 119°43'75.13" - 119°44'02.01" E.

Fishing Unit used in this study was fixed lift net (local name bagan tancap) with size 13 x 13 m, mesh size of net was 0.5 cm. The deep water was 9.4 m during tide and 8.6 during ebbtide. The light used in this lift net fishing was LED lamps. LED lamps 500 W with 10 piece each 50 W. Source of existing light used from a generator 2800 W with merk SHIMURA SF 2800.

Catching fish using lift net was done at night. The lamp was well utilized to light the water that could gather in certain catchable areas. Lights that were used LED (Light Emitting Diode) lights with 50 watts of power. The collecting data by using experimental fishing 10 trips. The kind of data was total catch per trip (kg), main catch (kg), by catch (kg), and discard catch (kg). Fishes was identified by using book [5] and [6].

3. Result and Discussion

A total of 20 operations were conducted on 10 days fishing trip by one lift net during 21 July-22 August 2020 but there was no fishing operation during the full moon. The total catch from one lift net is 220.3 kg (Fig. 1,2,3).

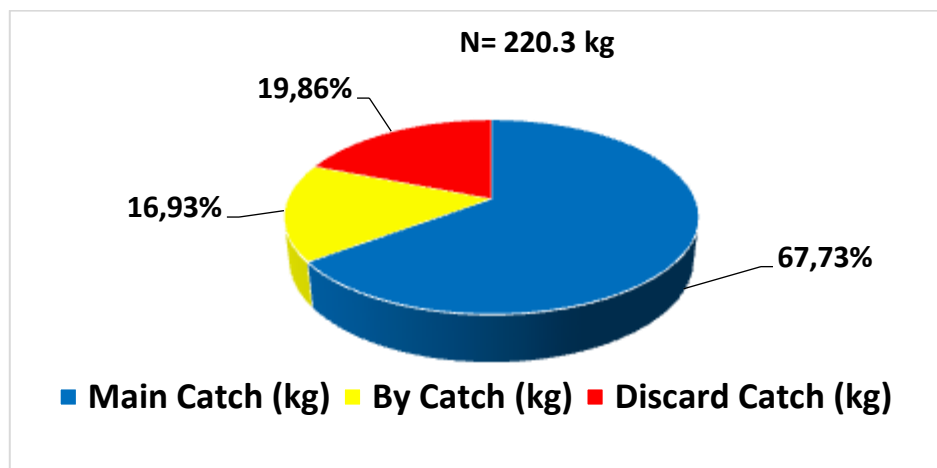


Figure 1. Percentage of main catch, by catch and discard of 10 trip fishing operations of set lift net with LED lamp as light attractor in marine coastal waters of Pangkep, Makassar Strait, Indonesia

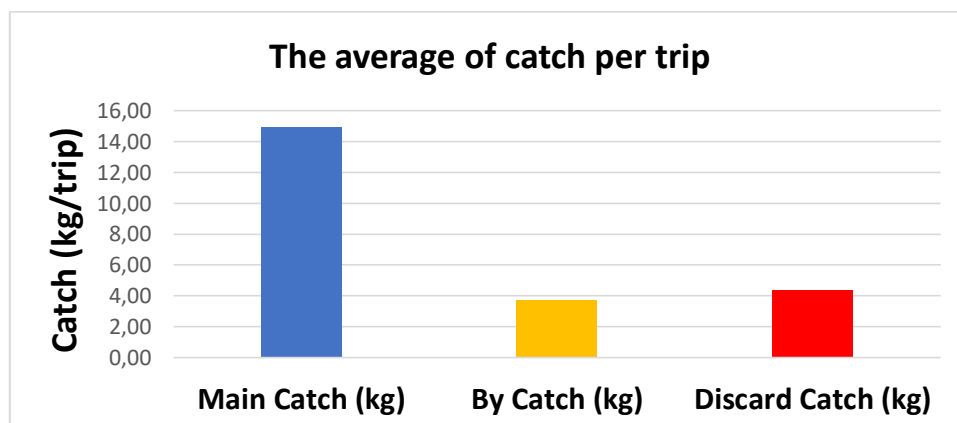


Figure 2. The Average catch per trip from 10 trip fishing operations of set lift net with LED lamp as light attractor in marine coastal waters of Pangkep, Makassar Strait, Indonesia

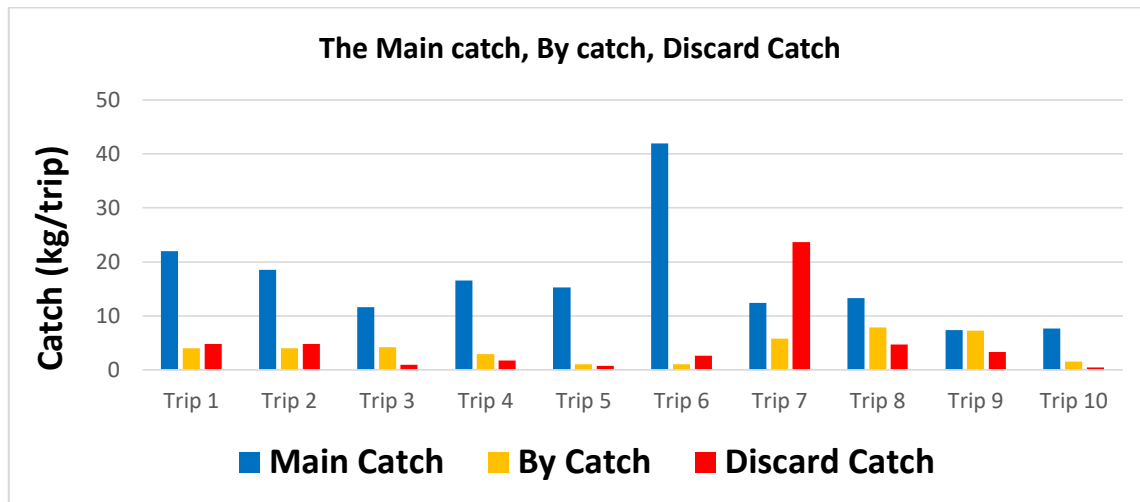


Figure 3. The main catch, by catch, discard catch per trip of set lift net with LED lamp as light attractor in marine coastal waters of Pangkep. Makassar Strait, Indonesia

The result of study show that the average of catch each hauling was 22.03 kg (range between 12.1-24.9 kg). The fishes catch consist of main catch 149.21 kg (average 14.9 ± 9.9 SD), by catch 37.288 (3.78 ± 2.4 SD) discard catch 43.76 (average 4.37 ± 6.8 SD).

The total fish catch during 10 trip fishing operations consist of 67.73 % main catch , 16.93 % by catch and 19.86 % discard catch. Main catch is a target fish that they have marketing values including anchovy (*Stolephorus* spp), scad mackerel (*Decapterus* sp), Indian mackerel (*Rastrelliger* sp), yellow stripe scad (*Selaroides* spp), 7,2 %, sardine (*Sardinella* spp), squid (*Loligo* spp).

More over, there is also non-target fish, namely bycatch fish and discard fish. Bycatch is fish that caught accidentally but still has a selling price in the market and also have a fairly high price. Including ponyfish (*Leiognathus* sp), *Leiognahtus berbis* dan *Leiognathus blochii*, moon fish (*Mene maculata*), barracuda (*Sphyraena genie* and *Sphyraena jello*), (*Tylosorus crocodilus*), (*Hemirhamphus far*), (*Therapon theraps*), (*Priacantus* sp).

Discard catch is fish that is accidentally caught but do not have a selling price in the market and also have no economic value, due to being toxic, stinging and dangerous for consuming including (*Arothron hispidas*), (*Diodon holacanthus*), (*Lactoria cornuta*), (*Rabdania* sp), jellyfish (*Aurelia aurita*), (*Scatophagus argus*), (*Gymnothorax enigmaticus*), *Pseudorhombus arsius*, and pakol *Balistapus undulates*.

There were 32 species fish catch from set lift net in marine waters of Pangkep. South Sulawesi consist of main catch was 13 species with (78% of totl catch , by catch was 13 spesies (11 %), and, discard catch was 6 species. (11 %) [7].

Bycatch is the non target fishes captured accidentally, while discard catch is the unwanted catch that are often dead [8]. Discard catch can cause increase fishing mortality, but reduce both productivity and stock abundance [9].

The occurrence of discard catch was caused by there is no market value of this species. Bycatch is an important consideration in an ecosystem-based approach to management of fisheries [10].

The lift net fishermen from Makassar, Maros and Pangkep fixe their set lift net fishing gear in marine coastal waters with dept 5-9 m not far from mangrove and coral reef ecosystem. The environment around coral reef contain many fishes that associate with this ecosystem [11]. The utilization of these fishes is more effective by using fixed lift net with LED lamps as an attractor [12].

4. Conclusion

The result of study show that the average of catch each hauling was 22.03 kg (range between 12.1-24.9 kg). The fishes catch consist of main catch 149.21 kg (67.73 %), by catch 37.28 kg (16.93 %), and discard catch 43.76 kg (19.86 %).

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